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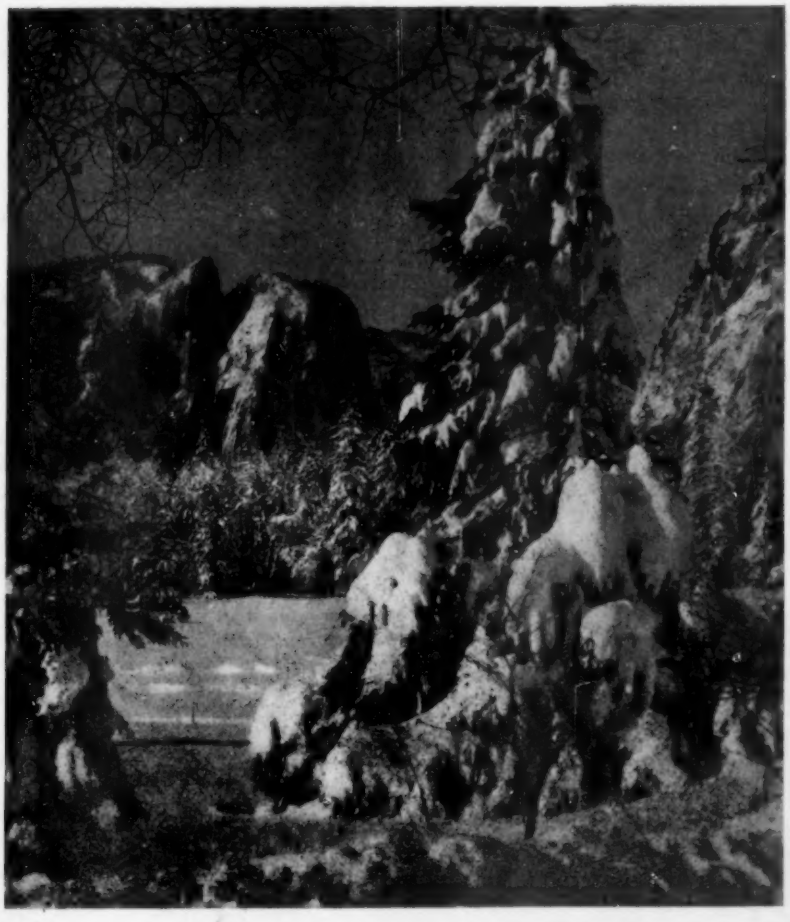
SCIENCE REVIEW OF THE YEAR

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



DECEMBER 21, 1935

Snow in a Land of the Sun

See Page 393

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXVIII *No. 767*

The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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DO YOU KNOW?

Glass razor blades are a new European invention.

Mushrooms contain vitamin D, a German physiologist has discovered.

Bananas from the tropics are marketed as far north as Alaska and Spitzbergen.

Two more safety zones for ducks and other waterfowl have been established in North Dakota.

Motor lifeboats on large ocean vessels are soon to be equipped with radio telegraph equipment.

A mosaic photograph of the State of Connecticut taken from the air is 18 feet by 13 feet in extent.

Chemists have succeeded in making some dormant oil wells spout again by a treatment of hydrochloric acid.

New German bar fixtures handle beer through glass tubing, entirely eliminating the tin tubing hitherto used.

Indian children of the Southwest had "chewing gum"—secretions that oozed from milkwood vines and other plants.

So curious are the effects of infra-red photography that various black dyed objects may appear in a picture as grays from practically white to black.

An improved method of detecting tiny quantities of lead in foods, and in checking lead fumes in factory air, has been found by government chemists.

Old China had a version of the motorcycle siren to clear the way for a celebrity: imperial bodyguards shot whistling arrows when the Emperor went driving.

A collection of Ethiopia's plants, gathered 100 years ago by the first European to become acquainted with Ethiopia's interesting flora, is now at the Field Museum in Chicago.

Doctors used to regard cancer and tuberculosis as diseases antagonistic to one another; but now it is realized that individuals may have both at once, and even in the same organ.

The giant aluminum industry recalls this picturesque bit of history: the first known object made of aluminum was a baby rattle presented to the small Prince Imperial of France, 1855.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

AERONAUTICS

What is the highest man has been above the earth? p. 388.

ANTHROPOLOGY

How did Palestine Man differ from his European contemporaries? p. 388.

ASTRONOMY

How old is the universe? p. 390.

AVIATION—ZOOLOGY

How can the little pocket gopher menace airplanes? p. 393.

BIOLOGY

What gas is produced by maturing fruits? p. 390.

Will bacteria grow at temperatures below freezing? p. 392.

CHEMISTRY

How can gas explosions be prevented? p. 393.

What precious liquid was concentrated by boiling down 75 tons of water for a year? p. 391.

EARTH SCIENCES

Are there tides in the solid earth? p. 391.

ENGINEERING

What is the shortest time required to cross the Atlantic by ship? p. 394.

GENERAL SCIENCE

What new institute will be headed by Prof. Kapitza? p. 392.

MEDICINE

Do pernicious anemia sufferers need to eat large amounts of liver daily? p. 399.

How can babies be saved from blindness due to cancer? p. 393.

How does brain fluid affect blood pressure? p. 392.

What scientists have been observing brain waves? p. 395.

PHYSICS

How is a giant magnet used to explore the tiny atom? p. 387.

What is the new value for the atomic weight of hydrogen? p. 396.

What is wrong with the acoustics of the U. S. Supreme Court room? p. 392.

What new use has been found for submarine batteries? p. 393.

PSYCHOLOGY

Can an adult learn faster than a child? p. 396.

PHYSICS

Giant Navy Magnet to Become Atom-Smashing Apparatus

Built at Time of War for Wireless Telegraph Transmitter, Now to Provide Powerful Research Tool

THE GIANT, and now-obsolete electromagnet of the Navy's radio station has been shipped to Columbia University where scientists will turn it into one of the most powerful tools in the world for smashing atoms and learning new facts about atomic nuclei.

Built for wartime use, the 130,000 pound electric giant long lay dismantled in a field. On Dec. 14 a fleet of trucks took the many 5-ton sections to Columbia's physics department where a special submerged concrete bed — jokingly called the wading pool from its appearance—awaited its coming.

So large are the various sections of the equipment that a special sloping trench has been dug, down which the apparatus can be skidded into its basement laboratory. When assembled it will stand ten feet high.

Across the large pole piece—forty inches in diameter—Columbia scientists will be able to create intense magnetic fields tens of thousands of times stronger than those of the earth which keep compasses pointing to the north.

In technical terms, the magnet will have a magnetic field strength of from 10,000 to 12,000 gauss.

The resurrection of the Navy's electromagnet will bring into use another apparatus for possible experiments on atomic transmutation, artificial radioactivity and studies on the happenings within the cores, or nuclei, of atoms when they are bombarded with other atomic particles accelerated to high energy in the device.

Pioneer equipment in the field is the apparatus of Prof. E. O. Lawrence of the University of California which still holds the record for size, weighing 85 tons and having pole pieces with an effective diameter of 45 inches.

The California apparatus has as its essential part another wartime electromagnet built for, but never shipped to, one of the now-defunct Chinese governments. At the time of the war such huge electromagnets were planned and built for Poulsen quenched arc wireless telegraph transmitters, the latest development at that time. The advent of vacuum radio tubes has now rendered this type of equipment generally obsolete for radio communication.

Explaining the operation and usefulness of the equipment, Dr. George B. Pegram, professor of physics at Columbia University said:

"The large atomic particle accelerator which we plan to build from the Navy equipment operates on the scientific principles used in the cyclotron apparatus as designed and employed by Prof. E. O. Lawrence at the University of California.

"Essentially, charged particles, either protons, the nuclei of hydrogen atoms, or deuterons, nuclei of the isotopic heavy form of hydrogen known as deuterium, are introduced into the cyclotron apparatus.

Once inside the accelerating chamber, which looks like a large covered frying pan, they are bent by the strong magnetic field existing across the pole pieces of the large electromagnet. Under the action of the magnetic field they travel round and round in a circular, or strictly, a spiral path.

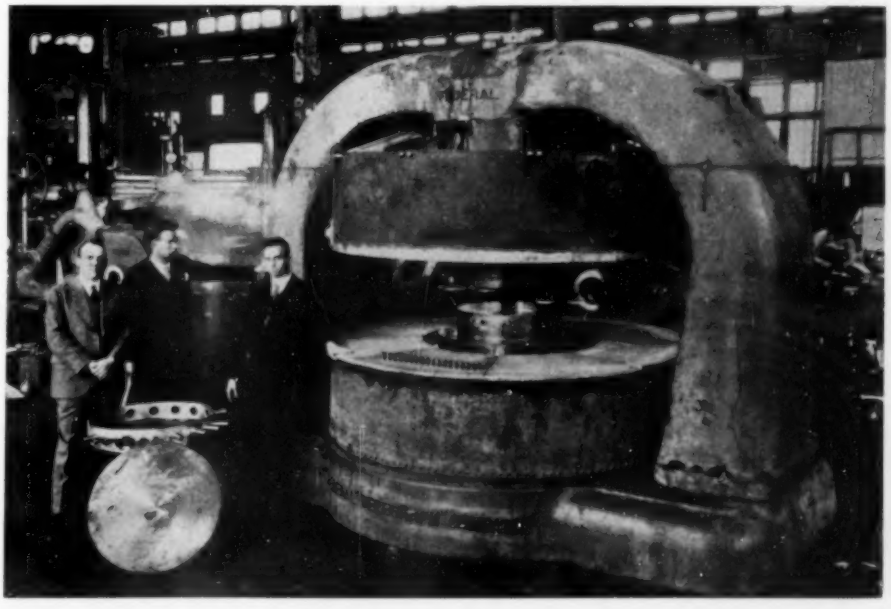
"Twice each trip around the circuit the charged particles are speeded up by several thousand volts potential provided and properly timed by auxiliary electrical equipment. These individual increases of velocity—often called electrical 'kicks'—ultimately raise the total energy of the whirling particles to very large values.

"In a few seconds and a few hundred trips around the circuit of Prof. Lawrence's apparatus, for example, the velocity and kinetic energy of the charged particles can be increased to several millions of electron volts.

"There are only a few other types of apparatus in the world which can create such high energy particles.

"The advantage to be gained by the use of an electromagnet with large pole pieces lies in the fact that with increasing energy at each revolution the accelerated particles spiral out from the center of the pole pieces. The number of revolutions they can make and hence the number of times their total energy can be raised in small steps, is thus intimately linked to the size of the pole pieces and the intensity of the magnetic field across them.

Science News Letter, December 21, 1935



WHIRLIGIG ATOM SMASHER

Giant 85-ton cyclotron atom-smashing apparatus of Prof. E. O. Lawrence at the University of California. Across its 45-inch diameter pole pieces shown above scientists can create magnetic fields, tens of thousands of times as powerful as those of the earth, for use in atomic transmutation experiments. The men left to right are: C. U. Foulds, Prof. E. O. Lawrence and Dr. M. S. Livingston. New apparatus shipped by Navy to Columbia University will give science a new device of same design and equally useful service.

GENERAL SCIENCE

Progress of Science

Outstanding Achievements Include Maintenance of Life Without Father or Mother Nucleus; New Altitude Mark

By SCIENCE SERVICE STAFF

OUTSTANDING 1935 achievements in ten fields of science as selected by Science Service are:

Aeronautics—The spanning of the Pacific by a commercial air line and the 14 mile-high stratosphere flight.

Archaeology — More discoveries of 10,000 B.C. man in America, including home life and art of Folsom man and Old Stone Age tools of Gobi type in Alaska.

Astronomy—Study of Nova Herculis with increased knowledge of stellar atmosphere and the finding of a peculiar radio disturbance on the illumined side of the earth every two revolutions of the sun.

Biology—Maintenance of animal life without either the paternal or maternal nucleus in the germ cell.

Chemistry — Concentration 99 per cent. pure of heavy neon, mass 22, and the creation of super-heavy element atomic number 93.

Earth Sciences—Earthquakes felt in eastern United States and Canada and in the Helena, Mont. region, stimulating seismological research in those areas.

Engineering—Completion of the Normandie and its trans-Atlantic record voyages.

Medicine — Isolation of the tobacco mosaic virus as a crystalline protein, indicating that viruses may not be living substances in the ordinary sense, and apparent identification of the human influenza virus and its cultivation outside the body.

Physics—High pressures of a million pounds per square inch revealing new properties of materials.

Psychology—New knowledge of the specialized functions of certain brain areas with implications for the treatment of mental disease.

Among the advances in science during 1935 were:

Aeronautics

The greatest height so far reached by man, 72,395 feet, was attained by Capt. Orvil A. Anderson and Capt. Albert W. Stevens, in the stratosphere balloon Explorer II at Rapid City, South Dakota.

The China Clipper, 51,000 pounds gross Martin flying boat, entered regular commercial service across the Pacific, making her maiden flight from San Francisco, to Honolulu, Midway Island, Wake Island, Guam, Manila and return in 122 hours, 42 minutes flying time.

Full sized, pilotless, radio-controlled robot airplanes, capable of speeds of 100 miles an hour and altitudes of 10,000 feet, were developed for anti-aircraft target practice in England.

The airship Macon was wrecked in a mild storm off the coast of California.

Coating of propeller blades, hub, and spinner cap with rubber treated with oil was a new method of repelling ice developed by the B. F. Goodrich Company.

A new testing device for whirling zeppelin models at 200 miles an hour to measure the strains encountered was developed by Guggenheim Airship Institute, Akron, Ohio.

Gasoline rated 100 octane antiknock increased power of Army airplanes by one sixth without weight increase.

A new instrument for plotting, on the ground, of the blind spots in a pilot's line of vision was developed by Melvin N. Gough, National Advisory Committee for Aeronautics.

A new fire resistant dope for airplane fabric was developed and under test at the National Bureau of Standards by Dr. Gordon M. Kline.

Air-cooled, heavy oil engines housed in wings were forecast on the basis of research conducted by the National Advisory Committee for Aeronautics.

A monoplane, said to be stall-proof and spin-proof, was built by the Curtiss-Wright Corporation for the Bureau of Air Commerce's safe-plane competition.

An airplane was refueled from a glider towed behind it in an experiment in Russia.

The two-blade propeller, one of the most powerful sources of sound known, has been studied by the National Advisory Committee for Aeronautics with the view of obtaining fundamental information concerning the noise emission.

Operation of the first mail service by rocket, a distance of two miles, was reported from England.

A new engine cowl with flaps was developed by the Pratt & Whitney Aircraft Company.

Construction was started by the National Advisory Committee for Aeronautics on a 500 mile per hour, 8-foot, high-speed wind tunnel

A two-stage centrifugal type supercharger for airplane engines was developed.

A 12 cylinder Vee type Diesel engine for use in the new Zeppelin airship was developed.

General adoption by the Army, Navy and commercial operators of the controllable-pitch propeller.

High lift devices were generally adopted for high speed military and transport airplanes.

Automatic power and mixture control was developed by the Pratt & Whitney Aircraft Company.

Vladimir Kokinaki, Soviet flyer, is reported to have reached a new height for airplanes at 14,575 meters (about 47,800 feet.)

The airplane altitude record for women was established by Marquise Carina Negrone, of Italy, at 39,511 feet.

A new distance record for seaplanes was established when Lt.-Comdr. K. McGinnis, U.S.N., with Lieut. J. K. Averill and T. P. Wilkinson, also of the Navy, as co-pilots, flew with a crew of three from Cristobal Harbor, Canal Zone, to San Francisco Bay, Alameda, Calif., 3,443.255 miles.

Brigadier General F. M. Andrews set a new world record for seaplanes over a 1,000 km. course of 165.040 m.p.h., August 24, 1935, in a Martin B-12A bomber.

Eight new records were established by D. W. Tomlinson and J. S. Bartles for various distances and amounts of payload, when they flew at 169, 191.67 and 190.0 miles per hour in a Douglas DC-1 monoplane.

A new speed record over a 3-kilometer straightway course was achieved by Howard R. Hughes when he reached 352.388 miles per hour at Santa Ana, Calif.

Fred and Al Key established a national endurance record by remaining in the air 27 days, 5 hours, and 4 minutes over Meridian, Miss.

A record flight from Los Angeles to New York was made by D. W. Tomlinson on April 30, averaging 221.434 miles per hour. hour.

A new woman's record for the Los Angeles-New York flight was established by Laura Ingalls when she made the trip in 13 hours, 34 minutes, 5 seconds.

The James Gordon Bennett balloon trophy was won by the Polish balloon, Polonia, piloted by Capt. Z. J. Burzynski.

Capt. Z. J. Burzynski, Polish balloonist, established several records for open gondola balloons when he reached 30,961 feet, traveled 1,025.5 miles and remained in the air for 57 hours, 54 minutes.

Anthropology and Archaeology

Extricating skeletons of Palestine Man from hardened rock, T. D. McCown, American anthropologist, found this contemporary of Europe's Neandertal Man almost a foot taller than the shambling European Neandertalers and more "modern" in his type of skull.

A skull of the Stone Age Neandertal race, the second discovery of Neandertal man so far made in Italy, was unearthed near Rome by the Abbé H. Breuil and Dr. C. A. Blanc.

A stone axe and back part of a human skull found in the Thames Valley, England, were tentatively placed in the Acheulian culture of the Old Stone Age and were believed to represent the second oldest human found in Britain.

Minnesota Man, much disputed skeleton of uncertain age, was investigated geologically by Dr. Kirk Bryan, Harvard, who pronounced the famous skeleton really ancient

according to evidence of undisturbed old layers of soil blanket.

Ancestors of the mysterious Tuaregs in the Sahara were the warlike Garamantes of ancient history, judging by pictures of the Garamantes discovered on rocks, Prof. E. F. Gautier, University of Algiers, reported.

An unknown tribe of natives, short, light-skinned, and Asiatic in their characteristics, was found by H. G. Hides, Australian official, when he explored 7,000 square miles of interior Papua.

A people bearing striking similarity to Plains Indians was encountered and measured in southeastern Tibet by Gordon T. Bowles, Harvard, whose theory is that these Tibetans and the Plains tribes are both off-shoots of an ancient blend of Europeans and Mongolians.

Protected by a powerful chieftain, an American expedition led by Dr. Vincenzo Petrullo spent three months in contact with the little-known Guajiro Indians of Venezuela, studying their culture.

Preparing a handbook to be used in teaching Navajo Indians to read and write their own language was a joint project undertaken by Prof. E. Sapir, Yale, Father Berard Haile of Gallup, N. M., and Albert Sandoval, of the Navajo tribe, for the Office of Indian Affairs.

A new scientific organization, the Society for American Archaeology, was formed with the aim of preserving American antiquities and stimulating research in New World archaeology.

Folsom Man, oldest known type of American, fashioned a variety of stone and bone tools and had ideas of art, it was learned by renewed excavations at the Folsom camp site in Colorado, discovered in 1934 by Dr. Frank H. H. Roberts, Jr., Bureau of American Ethnology.

Stone tools dug up on a college campus at Fairbanks, Alaska, were examined by Dr. N. C. Nelson, American Museum of Natural History, who pronounced them a match for Old Stone Age tools from the Gobi Desert, and called them "the first clear archaeological evidence we have of early migration to the American continent."

Man-made weapons buried 18 feet underground were found near Round Rock, Texas, by Prof. J. E. Pearce, University of Texas, who, from geological conditions, hailed the relics as convincing evidence that North America was inhabited over 20,000 years ago.

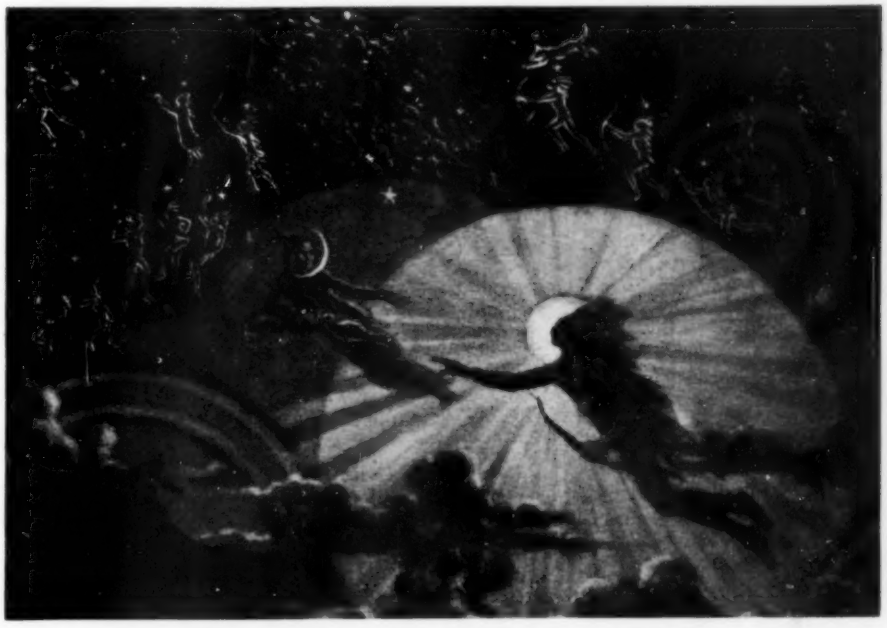
New light on village life in Alaska, some 2,000 years ago, was reported by Dr. Ales Hrdlicka, Smithsonian Institution, who found evidence of stone sidewalks, ivory portrait art, cannibalistic rites, domestication of the fox, and successful skull surgery.

Thirty ancient Indian villages and numerous island graveyards along the lower Columbia River were explored by H. W. Krieger, U. S. National Museum, in a race with time against flooding a 60-mile area by waters of Bonneville Dam.

Monte Alban, orphan city which archaeologists failed to place among Mexican prehistoric civilizations, was found by Dr. Alfonso Caso to have relationships with Toltec and Mayan civilizations, and to be as old as early Mayan cities.

At the invitation of the Government of Honduras, the Carnegie Institution of Washington assisted in repairing and protecting ruins of beautiful Copan, Mayan city, against earthquakes and river floods.

Two large pyramids were discovered near the famous Mexican pyramid of niches at Tajin, by Ignacio Marquina, Mexican government archaeologist, evidence that Tajin was once an extensive city.



INDIAN STAR LORE ADORNS PLANETARIUM

Something new in planetarium decoration is Indian star lore, shown at Hayden Planetarium, New York. The mural painted by Charles Knight suggests Blackfoot ideas. The Sun God pursues the Moon Goddess across the sky. Lower left, the Old Man sits making the world and sending animal creatures to the sea after clods of earth. Overhead, left, the dipper is marked by the six brothers and little sister, and at right are the six brother huntsmen and their three dogs of the Pleiades. The Milky Way lies between.

With the discovery of a prehistoric "crab culture" in Puerto Rico, trade-marked by its numerous crab remains, F. G. Rainey, Peabody Museum, Yale, reported that "at least two and possibly three cultural horizons can now be defined in Puerto Rico."

Irish archaeologists reported progress in finding a time chart for Irish prehistory by studying kinds of pollen embedded in different layers of 43 peat bogs.

Excavations in the Athenian market place, continued by Prof. T. Leslie Shear of Princeton University, revealed two more important buildings—a portico and a theater—and also a cemetery containing burials, some as old as the New Stone Age, 3000 B.C.

Excavations at Corinth, continued by the American School of Classical Studies at Athens, brought to light Corinth's system of flood control for city protection, and also resulted in discovery of temples, buildings, and art works.

Discovery of a ruined city, with palace and other buildings suggesting a local capital of importance in the Syrian-Hittite culture, was reported from North Syria by Dr. C. W. McEwan, Oriental Institute, University of Chicago.

Exploration of Antioch, Syria, continued by American and French institutions, located the island where palace buildings stood, traced the colonnaded main streets, and revealed fine mosaic pavements.

French archaeologists digging at Ras Shamra, Syria, uncovered signs of civilization so old as to rival the famed antiquity of Egypt and Mesopotamia, and showing Syria as having cradle cities around 4000 or possibly 5000 B.C.

"The oldest New Testament manuscript ever discovered" was the verdict on a small fragment of papyrus with verses of the Gospel of John, found in Rylands Library, Manchester, England, and estimated to date within a hundred years of the death of Christ.

Peeling the twelfth layer off the mound at Tepe Gawra, Mesopotamia, the joint expedition of the University Museum, University of Pennsylvania, and the American School of Oriental Research explored a 4000 B.C. city, finding surprising evidences of civilization in a city of the Neolithic Age.

Discoveries at Lachish, pronounced the most important in Palestine in a century, revealed Hebrew writings on pottery which are actual contemporary documents of events described in the Old Testament.

The terrific fire in which Joshua destroyed Canaanite Bethel, and the contrast between the rich Canaanite city and the succeeding poor Israelite town were revealed by the joint expedition of the Pittsburgh-Xenia Theological Seminary and the School of Oriental Research at Jerusalem.

New knowledge of life and tastes of middle-class Egyptians was obtained in a tomb of 1500 B.C. at Thebes, by the Metropolitan Museum of Art.

Russian archaeologists exploring in the Caucasus hills discovered there for the first time relics of ancient people buried layer upon layer, dating from the Neolithic age to the fifth century A.D.

Deciphering 5,000 hieroglyphs of a dead language, used in the medieval state of Tangut, Mongolia, was reported by the Oriental Studies Institute, Soviet Academy of Science.

A kitchen and the utensils and tools used by New Stone Age people, 6000 B.C., was found in the Himalayas near Srinagar by the Yale North India Expedition.

Astronomy

Nova Herculis, the star that flared up to extraordinary brilliance, just before Christmas 1934, was studied intensively, while it remained visible to the unaided eye until April, then it faded, and later became brighter again.

A new outpost of the universe, a faint nebular galaxy of stars, three sextillion miles (500,000,000 light years) from earth, with recession velocity of 50,000 miles per second was discovered at Mt. Wilson Observatory.

Prof. I. S. Bowen, California Institute of Technology, brought forward clear proof of how the formerly mysterious nebulium lines are practically all radiations of very common elements excited in peculiar but now understandable ways to emit radiations that they do not emit under conditions existing at the earth's surface, thus finally resolving an 80 year old enigma.

Electronic tides high in the atmosphere, supposedly caused by the moon, were investigated through effects on radio by Dr. Harlan T. Stetson, Harvard.

X-rays from the sun that never reach the earth were deduced from radio observations by Dr. Ernst A. W. Müller, Siemens Halske Co., Berlin.

Cosmic rays were suggested as the cause of the night light of the sky by Dr. Joseph Kaplan, University of California at Los Angeles.

An age of 10,000 billion years for the universe was estimated by Sir James Jeans, British astronomer.

Streamers from the sun for distances up to 500,000 miles were discovered by Dr. Philip C. Keenan, Yerkes Observatory, and called signposts to sunspots.

A peculiar radio disturbance in the illumined part of the earth every two revolutions of the sun was noted by Dr. J. H. Dellinger of the National Bureau of Standards.

Discovery of a dwarf star that may be one of the sun's half dozen nearest neighbors was made by Dr. W. J. Luyten and E. G. Ebbighausen, University of Minnesota.

Omega Centauri, one of the most renowned of all globular clusters, was found to be three times as large as previously estimated, as a result of measurements by Drs. Harlow Shapley and A. R. Sayer, Harvard University.

An expansion-speed of the universe, which nearly doubles previous values, was deduced by Sir Arthur Eddington, British astronomer.

Thousands of faint galaxies in the Horologium region were located by Dr. Harlow Shapley of Harvard Observatory.

The properties of transmutations suggest that the internal temperatures of stars are 1,000,000,000 degrees Centigrade, Dr. T. E. Sterne, Harvard, computed.

Solar activity increased and the largest sunspots groups in five years were observed.

The world's second largest stony meteorite, 700 pounds, was found in southwestern Kansas.

New comets were discovered by Prof. G. Van Biesbroeck, Yerkes Observatory, and by Drs. Cyril Jackson and E. L. Johnson, Johannesburg, South Africa.

An asteriod with large eccentricity and high angle of orbit, with period of revolution around the sun of six years, was discovered by Dr. Edwin P. Hubble, Mt. Wilson Observatory.

Hidalgo, little object that looks like an asteroid and travels like a comet, was rediscovered.

Comas-Sola comet was rediscovered by Dr. Hamilton M. Jeffers, Lick Observatory.

Dunlap Observatory of the University of Toronto, with a 74-inch diameter reflecting telescope, world's second largest, was completed.

New telescope mirror shaping method using aluminum deposition was developed by Dr. John Strong and Prof. Enrique Gaviola, California Institute of Technology.

Hayden Planetarium of the American Museum of Natural History was opened.

Casting and annealing of the disk for the mirror of the 200-inch diameter telescope of California Institute of Technology was completed at Corning, N. Y.

Dome of the McDonald Observatory on Mt. Locke, Texas, joint project Universities of Texas and Chicago, was completed.

An aluminum instead of a silver coating was given the mirror of the 100-inch telescope on Mt. Wilson.

The International Astronomical Union met at Paris.

Astronomical results were published in Turkish for the first time.

Biology

Animal growth without either paternal or maternal nuclei was demonstrated by centrifuging sea-urchin eggs and then treating them with concentrated sea-water, by Dr. Ethel Browne Harvey working at the Marine Biological Laboratory at Woods Hole, Mass.

Units of cellulose, held together in a pectin matrix, were isolated and seen for the first time by Mrs. Wanda K. Farr, U. S. Department of Agriculture, and Dr. Sophia H. Eckerson, Boyce Thompson Institute for Plant Research.

Maturing fruits and vegetables produce ethylene gas in their own tissues, it was shown by researches at three laboratories: the Minnesota Agricultural Experiment Station, the Low Temperature Research Station at Cambridge University, England, and the Boyce Thompson Institute for Plant Research, Yonkers, N. Y.

Eyes of the larva of the fruit-fly, or Drosophila, were successfully transplanted to the abdomens of other individuals, by Boris Ephrussi and G. W. Beadle, in Paris.

A monkey embryo in the blastocyst stage was found by Dr. George L. Streeter, director, Carnegie Institution of Washington's department of embryology, in Baltimore.

An ornithological expedition made permanent records of the songs of rare birds in the South, working under the auspices of Cornell University and the Carnegie Institution of Washington.

Dyes of certain types render living cells more sensitive to the lethal effects of light, Prof. D. H. Tennent of Bryn Mawr College discovered.

The air at 20,000 feet and over was found to be germ-free by Dr. George Walker of Baltimore.

Spores of fungi taken nearly 14 miles into the stratosphere on the flight of the National Geographic Society-Army Air Corps balloon Explorer II survived the cold, solar radiation and other extreme conditions of the journey.

A lily that never sheds its pollen was produced by D. N. Moore in the laboratories of the General Electric Company, by X-raying bulbs for several successive generations.

The plant hormone auxin, chemical substance stimulating growth was produced synthetically by Drs. K. V. Thimann and J. B. Koepfli, California Institute of Technology.

Irritability in protoplasm was traced to a substance of unknown composition, called "R," by Drs. W. J. V. Osterhout and S. E. Hill, Rockefeller Institute for Medical Research.

Pantothenic acid, believed to be a universal essential in growth and respiration of cells of living bodies, was isolated by Prof. Roger J. Williams, Oregon State College.

Southern pine forests produced an exceptionally large seed crop.

Properly controlled fires are beneficial to growing pine woods in the South, evidence produced before the annual meeting of the Society of American Foresters indicated.

Forest fires increased in number but decreased in total area burned over.

A program of basic research in biology was planned by the Department of Agriculture.

Establishment of "wilderness areas" in all countries of the Americas was advocated by Dr. John C. Merriam, president of the Carnegie Institution of Washington, in an address before the Pan American Institute of Geography.

Neon lamps were used instead of the conventional incandescents, in forcing plants and flowers in the greenhouses of the Agricultural College of Wageningen, The Netherlands.

A College of Agriculture was organized at Hebrew University in Jerusalem.

More than 3,300 ants, each part male, part female, were found in one colony in Trinidad, by Dr. N. A. Weber, Harvard.

The Sixth International Botanical Congress was held at Amsterdam, during the first week in September.

Trees afflicted with Dutch elm disease were found in Virginia and Indiana.

A new food factor necessary for the growth of chickens was discovered by Dr. H. Dam of Copenhagen, and named vitamin K.

Plantings were begun in the great Western Shelterbelt project, largely utilizing species native to the region planted.

Insect heads were successfully transplanted to bodies of other insects of the same species, by Dr. Atma Malabotti, Vienna Academy of Sciences.

A band of rays in the almost invisible red has a powerful retarding effect on plant growth, it was discovered by Dr. L. H. Flint, U. S. Department of Agriculture and Dr. E. D. McAlister, Smithsonian Institution.

Methods were developed by U S. Public Health Service investigators to show graphically the bactericidal effect of the beta rays as compared with the non-bactericidal gamma rays of radium; and the irradiation of bacteria by radium emanations was shown to produce profound cultural and morphological changes.

Air-conditioning methods were applied in the transportation of parasitic wasps used in combating insect pests.

A world-wide survey of breeding stocks of domestic plants and animals was inaugurated by the U. S. Department of Agriculture.

A "Farm Chemurgic Council," to promote the use of agricultural products in industry, was formed, with Francis P. Garvan as its first president.

Chinch bugs, much feared at the beginning of the growing season, did little damage in the Grain Belt.

On the occasion of the fifth anniversary of the plant patent law, a check-up disclosed that only 124 plants had been patented.

A comprehensive survey of the enemies of oysters was begun by the Bureau of Fisheries.

Several large wilderness areas, comprising a total of nearly 8,000,000 acres, were set aside as game preserves by the Soviet Government.

Pennsylvania's last scrap of virgin timber, 4,000 acres in extent, was acquired by the U. S. Forest Service, to be kept as a wilderness area.

Chemistry

The heavy isotope of neon, mass 22, was concentrated to 99 per cent. purity by Dr. Gustav Hertz of Berlin.

Work by Prof. F. W. Aston, Cambridge University, has indicated some 20 new isotopic varieties of chemical elements, bringing the total number of known isotopes to 247 stable varieties among 79 of the 92 elements.

First definite proof of the existence of a super-heavy element beyond No. 92 in the periodic table was obtained by Dr. Aristid V. Grosse, University of Chicago.

With an improved mass spectrograph Prof. A. J. Dempster, University of Chicago, obtained, for the first time, evidence of the existence of isotopes of gold and platinum.

Because atomic weights depend on the proportions of the various isotopes of the element present, further work in this once-important chemical field was held useless by Prof. Harold C. Urey, Columbia University.

By "boiling down" 75 tons of water over a period of a year, ten drops of precious liquid containing a high concentration of the rare hydrogen isotope of mass three was obtained at Princeton University.

Heavy water, made of ordinary hydrogen combined with the heavy isotope of oxygen, was announced by J. B. M. Herbert and M. Polanyi, Manchester University, England.

Using heavy water molecules as "tracers," Prof. George von Hevesy and E. Hofer, Freiburg University, Germany, showed half the amount of any drink of water is still in the human body after nine days.

Evidence of "lost" chemical elements no longer present on the earth was found by Prof. George H. Henderson, Dalhousie University, Halifax, Canada, from study of halos in mica formed by radioactivity.

New discoveries about the chemical structure of vitamin B, by Dr. R. R. Williams and his coworkers at Columbia University, led to hope that it may be synthesized.

Huge reserves of carbon dioxide gas, from which "dry ice" is made, were discovered near Imperial Valley in California.

A chemical method of plasticizing rubber in place of more expensive mechanical chopping and crushing was developed by Ira Williams and C. C. Smith, E. I. duPont de Nemours and Company.

A new process of purifying potash developed by chemists of the U. S. Bureau of Mines holds the hope of freeing America from the necessity of potash imports in event of war.

A mixture of di-phenyl and di-phenyl oxide, chemical cousins of the synthetic geranium perfume, is being used to replace water in steam boilers for increased efficiency, C. G. Brown, G. A. Gaffert, P. H.. Konz and D. S. Ullock, University of Michigan, reported.

Earth Sciences

The entire northeastern part of the United States felt, on Nov. 1, an earthquake that centered near Lake Nipissing, in northern Ontario.

A series of destructive earthquake shocks damaged Helena, Mont., during the last ten days in October.

A local earthquake was felt at the Grand Canyon of Arizona on Jan. 15.

CHRISTMAS TREE'S ANCIENT KIN

This might have been a Christmas tree, if there had been any Christmas, or children to celebrate it, 250 million years ago. Despite its almost palm-like appearance, it is a remote relative of modern spruces and pines, that lived during the Coal Age. This synthetic restoration is on display in the Field Museum of Natural History, Chicago.

A total of 25 earthquakes was recorded by seismographs in the United States.

Disastrous earthquakes, killing thousands of people, visited Formosa a few days before Easter, and northern India on May 31.

Correlation between the position of the moon and the occurrence of deep-focus earthquakes was demonstrated by Prof. Harlan T. Stetson, working at Harvard College Observatory.

Mauna Loa, Hawaii's loftiest active volcano, erupted a stream of lava on Nov. 23, but caused only minor damage.

Vesuvius was in eruption, emitting streams of lava.

A volcanic crater in the Pinacate region in Sonora, Mexico, just across the U. S. boundary, was reported in eruption in January.

An expedition of the Carnegie Institution of Washington studied volcanoes in Central America.

The U. S. Weather Bureau's hurricane service was reorganized, with three stations at San Juan, P. R., Jacksonville, Fla., and New Orleans, La.

A total of 5 hurricanes was recorded from Southern waters.

Florida was twice swept by destructive hurricanes.

The record-breaking Great Drought apparently ended; precipitation decidedly above normal caused serious delays both in spring planting and in fall harvesting; and there were serious floods on some of the Plains rivers.

Dust storms again raged in the West, during early spring.

A persistent fog over almost the entire East and Midwest held up all air traffic for nearly a week in January.

Two villages were destroyed by an ice-avalanche in northern Russia, with a loss of 88 lives.

The establishment of a central Governmental map-making body, combining the work of a number of scattered bureaus, was recommended by the Science Advisory Board.

A remarkable series of educational films illustrating geological processes was made, as a cooperative enterprise of the U. S. National Park Service, the University of Chicago, and Erpi Picture Consultants, with the aid of C.C.C. workers.

Preparations were made for digging a ship canal across northern Florida.

The Great Geysir of Iceland, prototype of all geysers, resumed eruptions, after a quiescent period since 1914.

Mysterious Easter Island and "Robinson Crusoe's Island" in the Juan Fernandez group were set aside as national parks by the Chilean Government.

An expedition from the Hawaiian Academy of Science climbed Mauna Kea, the highest peak in the islands, and spent a week at its summit.

Soviet expeditions penetrated the Arctic Ocean north of Russian territory, discovering a number of islands and breaking a path through to Bering Strait.

Lincoln Ellsworth, noted explorer, made several new discoveries in Antarctica, but appeared to be lost in an attempt to cross the frozen continent by airplane.

Seismic soundings by the Byrd Expedition determined the thickness of the ice sheet over parts of Antarctica.

A large air photo map, comprising the entire state of Connecticut, was completed.

The American Geographical Society of New York completed the first of a series of Northern Labrador map sheets that embrace 5,000 square miles.

The one to one millionth map of Hispanic America by the American Geographical Society of New York, the largest mapping enterprise by a non-governmental organization, was brought to a conclusion after 15 years of work.

Addition of daily airplane flights to 15,000 foot altitude at about 20 locations allowed the U. S. Weather Bureau to combine air mass analysis with other methods of weather forecasting as recommended by the Science Advisory Board.

Mammoth and Dixon Caves in Kentucky were demonstrated to be part of the same cave complex, by Dr. E. R. Pohl, technician of the Emergency Conservation Work.

Lunar tides in the solid earth, altering the distance between Europe and America by as much as 63 feet in a year, were shown to exist by Prof. H. T. Stetson, astronomer, and Dr. A. L. Loomis, physicist, working in the latter's private laboratory at Tuxedo, N. Y.

A device for taking sample cores of sea-bottom was developed by the Carnegie Institution of Washington, the Geological Society of America and the du Pont Powder Company.

Fossil-bearing rock specimens, picked up by dredging off the northern Atlantic seaboard, upset the long-held belief that the sea bottom in this region has had a long period of stability.

(*Turn to page* 394)

GENERAL SCIENCE

U.S.S.R. Institutions Centralized at Moscow

CENTRALIZATION is the order of the day in the activities of the Academy of Sciences of the U.S.S.R. The Academy's principal activities, formerly divided between the one-time capital at Leningrad and the present capital at Moscow, have been concentrated at Moscow; and in addition, in several instances bureaus once separate have been consolidated.

Outstanding is the establishment of an Institute for Physical Studies, under the directorship of Dr. P. L. Kapitza, for whom the research apparatus he used at Cambridge University has been purchased and transferred to Moscow.

Other research bodies established by the reorganization of the Academy include Institutes of General and Inorganic Chemistry, of Animal and Human Physiology, and of Evolutionary Morphology and Paleozoology, a Laboratory of Mechanics, and several museums.

Science News Letter, December 21, 1935

PHYSICS

Sound Flutter Mars Main Room of U. S. Supreme Court

THE ACOUSTICS of the new Supreme Court Building in Washington are so bad in the main courtroom that Justice Stone at one end of the bench cannot hear Justice Butler at the other end clearly, it was revealed reluctantly at the meeting of the Acoustical Society of America.

There's nothing wrong with Justice Butler's voice, for he can't hear Justice Stone either. Moreover, persons sitting near the middle of each side of the huge room cannot hear what lawyers are saying if they stand in certain spots of the room.

The amazing acoustical flaw in the courtroom of the highest court in the nation was described by V. L. Chrisler, expert of the National Bureau of Standards in Washington, who told the cause and possible cure of the architectural fault.

Specially treated walls and ceiling were built into the courtroom when it was constructed, but for beauty in keeping with the rest of the magnificent edifice four great eight-foot-tall marble slabs adorn the corners of the room.

Tests by Mr. Chrisler showed that sounds are reflected back and forth on the two diagonals of the room and that the ends of the justices' bench where sit Justice Stone and Justice Butler are right near these diagonal "lanes of sound." Experiments demonstrated that sounds starting in the diagonal lanes can rarely be heard clearly due to so-called "flutter."

Flutter is a type of reverberation sound phenomenon where sounds persist for some seconds so that any given word in a speech extends and overlaps following words with the result that they blend into a confusing Tower of Babel mixture.

One way to cure the fault is to place about the room sound-absorbing materials which cut down the time a given sound persists. Architects are now considering such absorbing material in front of the four marble slabs.

Science News Letter, December 21, 1935

MEDICINE

Link Between High Blood Pressure and Brain Fluid

A LINK between high blood pressure and the fluid which bathes a portion of the brain has been found by Dr. Irvine H. Page of the Hospital of the Rockefeller Institute for Medical Research. (*Science*, Dec. 7)

This fluid contains a substance which brings about a high blood pressure by stimulating a portion of the brain known as the diencephalon, it appears. While the discovery has significance, Dr. Page does not, however, claim that he has found the cause of high blood pressure.

Some patients suffering from the kind of high blood pressure known to physicians as "essential and malignant hypertension" show signs and symptoms like those which occur when centers in the diencephalon are irritated, Dr. Page previously noted. An extract of the fluid which bathes this portion of the brain was injected into cats' veins. The blood pressure rose sharply to a high peak..

Fluid from the brain cavities of five cases of malignant hypertension, one case of high blood pressure associated with cancer of the adrenal glands, and three cases of kidney disease with high blood pressure was examined, and all contained the blood pressure-raising substance. Fluid obtained at operation from a patient with a brain tumor and from a patient suffering from epilepsy with hydrocephalus had no blood pressure-raising effect. Fluid from a patient with normal blood pressure who died as the result of a gunshot wound contained but moderate amounts of blood pressure-raising substance.

Science News Letter, December 21, 1935

IN SCIE

BIOLOGY

Bacteria and Wild Yeasts Multiply Below Freezing

BACTERIA and wild yeast species can live and even increase in numbers at temperatures well below freezing, experiments performed by Miss Helen F. Smart of the U. S. Department of Agriculture indicate. (*Science, Nov.* 29)

Miss Smart found 26 distinct species of bacteria and yeasts on fruit preserved by freezing for three years. They were insignificant in numbers, and all of harmless species; but it was considered interesting that they could survive at all under the circumstances. She accordingly planted samples of each kind in tubes of nutrient material. She kept the tubes in a refrigerator, at 16 degrees Fahrenheit, and examined them every month for a year, to detect possible signs of growth.

Eight of the species did increase visibly, though very slowly—not much more growth in a year than they could make in 18 hours at room temperature. Thirteen species showed no growth, but when the tubes were warmed up to ordinary temperatures they immediately went into action, showing that they had survived the long chill with their ability to grow still unimpaired. Only five species were apparently lifeless.

Science News Letter, December 21, 1935

ARCHAEOLOGY

Cave Dwelling of Ice Age Hunters Found in Germany

A CAVE where Ice Age cave bears lived, where Ice Age cave men pursued and killed them, and took over the den as their own dwelling while they gnawed their bones, has been discovered and explored in Schleswig, by Dr. Lothar F. Zotz, curator of prehistory of Breslau.

Many of the bones and teeth of the monstrous bears found in the cave have been worked over into implements and utensils, and there are abundant charcoal remains of the old hunters' fires. This cave, Dr. Zotz says, is the first of its kind to be found in northeastern Germany.

Science News Letter, December 21, 1935

...E FIELDS

PHYSICS

Huge Submarine Batteries Used in Atomic Research

SALVAGED from now-obsolete Navy submarines at the New London, Conn., navy yard, huge batteries which formerly drove Uncle Sam's subs beneath the waves are being used at Columbia University in scientific experiments testing theories concerning the "spin" of electrons in the atom.

The batteries each stand five feet high, weigh 1,600 pounds and have a rating of 3,000 ampere-hours at two volts. The ordinary drycell battery which may run the doorbell in the home also has a two-volt rating. Batteries in motor cars are usually of six volts potential and have a capacity rating of only 100-110 ampere-hours.

In experiments under the direction of Prof. I. I. Rabi of Columbia's physics department, the giant batteries are connected in parallel and yield currents of hundreds of amperes. The intense magnetic field generated when these large currents are passed through helical coils is used to deflect charged ions. The study leads to new knowledge of the clockwise or counter clockwise spin of the electrons in the atoms which is intimately bound up with theory concerning magnetism. Rare isotopes can also be detected with the device.

Science News Letter, December 21, 1935

CHEMISTRY

Gas Explosions Prevented By Suffocating Vapors

SMOTHERING dangerous vapors to the point of suffocation is the latest method of preventing dangerous gas explosion which has been developed by scientists of the U. S. Bureau of Mines.

Inert, non-combustible carbon dioxide and nitrogen gas are the smothering agents used to prevent disaster in gas lines, gasoline tank cars and storage holders while they are being repaired.

In air-tight rooms in the Bureau of Mines laboratory various gas burners were lighted and allowed to run until their flame was extinguished from lack of oxygen. By analyzing the oxygen content of the room at this time the critical percentage of oxygen was determined below which combustion could not occur. From 10 to 12 per cent. of the normal oxygen content was found sufficiently low for safety.

The suffocating and diluting carbon dioxide and nitrogen gases were then pumped into the air-tight room, containing an explosive mixture, until the oxygen content was lowered to the critical non-combustion supporting stage. Again the flame would not burn.

The discovery should find use as a precautionary measure in closed places, with a great improvement in safety.

Science News Letter, December 21, 1935

METEOROLOGY

California, Land of Sun, is Proud of Christmas Snows

See Front Cover

SNOW and California would seem at first glimpse to be mutually irreconcilable ideas. Yet Californians are proud of the snows that fall in their state, and with right: saw you ever a lovelier Christmas landscape than this, in Yosemite National Park? These winter snows of the Yosemite, indeed, are not only beautiful in themselves; they are indispensable for the maintenance of the Park's summer beauty as well. The waterfalls that seem to drop from the sky itself, the firmament of flowers on the valley floor, the dark and awesome giant trees, are all the offspring of the white, brief glory of the snow.

Science News Letter, December 21, 1935

AVIATION—ZOOLOGY

Pocket Gophers Become Menace to Airplanes

GREAT transport planes, carrying tons of passenger and freight loads, have reason to be afraid of pocket gophers, small animals less than the size of rats or squirrels.

The gophers love the open grass stretches of landing fields, and burrow shallow runways close to the surface, making landings rough and bumpy, and sometimes tripping up a plane into a "nose-over."

The U. S. Biological Survey, which has had long experience in ridding ranches and farms of small rodent pests, has lately been cooperating with the Bureau of Air Commerce in ridding landing-fields of the troublesome pocket gophers.

Science News Letter, December 21, 1935

MEDICINE

Babies Doomed to be Blind Are Now Saved by Radium

ONE of the most hopeless conditions, cancer in the eye of a newborn infant, with the choice lying between a lifetime of blindness or death, is yielding to the curative power of radium, Dr. Le Grand H. Hardy, director of the eye service of the Fifth Avenue Hospital, New York, told a conference of the National Society for the Prevention of Blindness.

To save the infant's life, it was formerly necessary for the surgeon to remove the affected eye. Only too often, the cancerous growth recurred in the other eye. The application of radon seeds to the cancer in such desperate cases "has been attended with some measure of success and holds forth a promise of more hope for the future," Dr. Hardy said. Some otherwise hopelessly lost eyes have been salvaged by this form of treatment and eye specialists hope to perfect and extend the method of treatment so that still more vision can be saved.

Modern surgeons are audaciously making the "human dead serve the living," Dr. Hardy said in describing other important recent advances that are giving sight to the blind.

"Russians have conscripted the blood of their traumatic dead for transfusions and in this country and England surgeons have successfully transplanted parts of the cornea from a dead eye to a living human host," Dr. Hardy said.

The attempt to transplant "clear, transparent tissues to take the place of the horrible white scars which so completely shut off from many blind eyes a clear view of the world without" was made over a hundred years ago, perhaps earlier, Dr. Hardy said. It is an effort to solve one of the major problems in sight restoration.

The outstanding progress in sight restoration in the past few years has been made in the treatment of detached retina.

"Until recently the chances of recovery from this condition were less than one per cent. It was a situation met mainly with despair. Today a much more hopeful attitude is taken. As a result of a tremendous amount of work leading to more accurate diagnosis and the introduction and perfection of radically different surgical technic the percentage of cures has rapidly risen and for certain types of detachment the patient is now offered close to a 50 per cent. chance of recovery."

Science News Letter, December 21, 1935

From Page 391

A fulgurite, or "lightning stone," 23 feet long was mounted and placed on display at the University of Chicago.

Iceberg numbers in the Grand Banks region were "just about average" this year, the Hydrographic Office of the U. S. Navy stated.

Fossils of very early mammals, possibly including ancestors of the primates, were discovered in the West by three expeditions, respectively from Princeton University, St. Louis University, and the American Museum of Natural History.

Peking Man, one of the earth's earliest inhabitants, used redbud wood in his hearthfire, studies by Dr. Ralph W. Cheney and Lyman H. Daugherty, Carnegie Institution of Washington, disclosed.

The U. S. National Museum acquired remains of a fossil flying reptile in Texas, and fossil collections of dinosaurs, including bird-footed types in Montana, and primitive mammals in Wyoming.

Death Valley yielded fossils of a titanothere to an expedition from the California Institute of Technology.

Bones of an extinct peccary, a pig-like animal, were found in excavating for a new postoffice in St. Louis.

A fossil louse 30 million years old was discovered in oil shale, by scientists of the U. S. Geological Survey.

Five fossilized skeletons of extinct sea-cow-like animals were found in Sakhalin by Dr. Ko Nagao, Japanese paleontologist.

The largest trilobite fossil on record, more than two feet long, was found by Irving G. Reimann, Buffalo Museum of Science.

A veritable "mine" of insect fossils was discovered on the Arctic coast of the U. S. S. R.

Fossils of hitherto unknown kinds of extinct mammals were found in an unexplored part of Patagonia by Dr. George Gaylord Simpson, American Museum of Natural History.

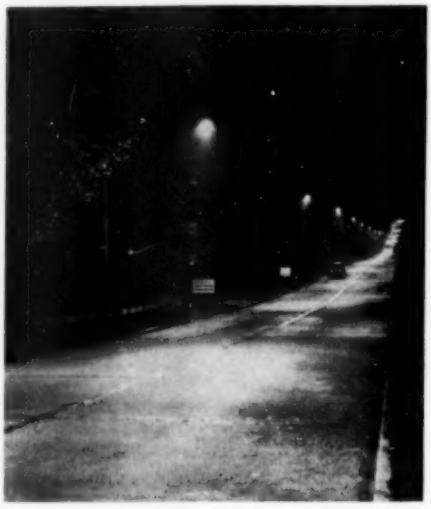
Among noteworthy fossil finds were the skull of a freshwater shark in New Mexico, a giant turtle and a mosasaur in Alabama, elephants in Georgia and Oklahoma, a cat-like animal in Wyoming, a whale skull in California, and an opposum in Colorado.

Studies tracing the descent of hippopotami and giraffes, now found only in Africa, were completed at the American Museum of Natural History, New York City, by Dr. Edwin H. Colbert, using fossils collected in India's Siwalik Hills.

A decline of birthrate of all classes during the economic depression, but a birthrate higher for those on relief than for those in better circumstances, was discovered from a survey by Drs. Frank W. Notestein and Clyde V. Kiser, Milbank Memorial Fund, who ascribe the differential to differences in birth control practices.

The number of persons over 65 years of age in the United States will increase from 7,500,000 to 17,000,000 by 1980, it was estimated by President Roosevelt's Committee on Economic Security; a much higher figure, 25,000,000, was the estimate of Drs. Louis I. Dublin and Alfred J. Lotka, Metropolitan Life Insurance Company.

A movement of American population during the depression toward poor farming regions in contrast to the previous movement toward cities, and a movement of industry from big cities and small towns toward medium sized communities near large cities, was found by Dr. Carter Goodrich and Daniel Creamer, Study of Population Redistribution.



LIGHT ON THE ROAD

A new type highway lighting system provides for a continuously illuminated road without glare for the motorist's eyes. The installation is being demonstrated on a mile-and-a-quarter stretch near Cleveland.

Engineering

A new system of ultra-short wave radio transmission which is less subject to static was developed by Major Edwin H. Armstrong, professor of electrical engineering, Columbia University.

A commercially practical method of applying non-corrosive coating of aluminum on iron and steel was patented by Prof. Colin G. Fink, Columbia University.

"Coaxial" cable, which will carry 240 telephone talks or a high-grade television circuit, was announced by the Bell System.

Electric power transmission by direct current, employing vacuum tubes, was announced by General Electric laboratories.

Maine's Passamaquoddy Bay tide power project was begun.

The first section of Moscow's subway, seven miles in length, was opened for use after two years of construction.

A new type of color film for 16 mm home movies, which does not require a special filter and consists of five layers sensitive to red, green and blue-violet light, was introduced by the Eastman Kodak Company.

The liner Normandie established new records for crossing the Atlantic, westward on June maiden vovage in 4 days, 11 hours, and 42 minutes, eastward in 4 days and one hour.

The highway bridge at Grand Coulee Dam was the first structure completed on the Columbia River project.

The $8,000,000 Little Belt bridge connecting Jutland and Fuenen Island in Denmark was opened for traffic.

First traffic was begun over the Zambesi River railroad bridge in Africa which has a length of 12,064 feet, said to be the longest in the world.

The new automobile traffic tunnel beneath the Hudson River at West 39th Street, New York City, was "holed through."

The "voice mirror," which records speech on a magnetic tape and immediately plays it back to the speaker, was demonstrated by Bell Telephone Laboratories.

Talking around the world was at last accomplished when speakers in adjoining rooms in New York conversed over a wire and radio circuit.

A new alloy of iron, aluminum, nickel and cobalt, and named Alnico, was announced by General Electric as a powerful permanent magnet material.

Electrification of the Pennsylvania Railroad from New York to Washington was completed.

A new type of heavy tungsten alloy was developed in England for making more compact "bomb" shields for radium in place of the lead shields now used.

First motion pictures ever taken of combustion of flame inside Diesel engine were made by A. M. Rothrock, National Advisory Committee for Aeronautics scientist.

New sound detectors invented for the U. S. Army were claimed to detect an airplane 12 miles away.

Construction was under way in Great Britain on a new non-magnetic ship to replace the lost *Carnegie* of the Carnegie Institution of Washington in the field of world-wide marine magnetic surveys.

A sailboat with revolving mast, no boom or foresail was invented by Dr. Fredrik Ljungström, Swedish engineer, and promises to revolutionize small boat sailing.

A new type of telephone transmitter with low noise level and freedom from line noises was developed by the Bell Telephone Laboratories.

A machine with a "memory," which makes complete records of such quick happenings as lightning strokes before, during and after they occur, was developed at the General Electric Research Laboratory.

A system of high detail television was begun experimentally by the Radio Corporation of America.

Ultra-short radio waves were sent a record distance in tests between London and Buenos Aires, over 6,000 miles.

A new type electric motor, which runs on alternating current but has variable characteristics of a direct current motor, was announced by Dr. E. F. W. Alexanderson, General Electric engineer.

More Diesel-electric powered trains or rail cars were placed in operation.

A new high temperature for commercial electric furnaces, 3,000 degrees centigrade, was obtained in the new rotating type developed by M. Henri George, Electrothermal Laboratory, Paris.

A process of printing from rubber plates was developed by the B. F. Goodrich Rubber Company.

New developments in the construction of secondary highways for light traffic included the use of salt as a binder and of cotton webbing to prevent wrinkling of the surface.

A garbage grinding device which aids disposal of kitchen waste down the sewer drain was introduced by the General Electric Company.

Waterproof wood, embalmed clear to its center with wax, was developed at the U. S. Forest Products laboratory.

Patent No. 2,000,000, which is for the construction of rubber tires for railroad trains, was awarded by the U. S. Patent Office.

Medical Sciences

The virus that causes the plant disease, tobacco mosaic, was isolated by Dr. W. M. Stanley, Rockefeller Institute, Princeton, N. J., as a crystalline protein, thus, according to

Dr. Stanley, characterizing a new class of disease-producers and indicating that viruses may not be living substances in the sense that bacteria, plants and animals are.

Identification of the virus of human influenza and its cultivation outside the body were reported by Drs. Thomas Francis, Jr., and T. P. Magill of the Rockefeller Institute.

First definite evidence of a vitamin participating directly in a physiological process was found by Dr. George Wald, Harvard University, who found vitamin A in the eye's retina and active in vision.

Relief and apparent cure of a fatal type of high blood pressure by surgical operation was reported by a number of surgeons, working independently and using different surgical technics, among them Dr. Alfred W. Adson, Mayo Clinic; Dr. Max M. Peet, University of Michigan Medical School; Dr. Irvine H. Page, Hospital of Rockefeller Institute for Medical Research; and Dr. George J. Heuer, New York Hospital.

Study, at many research centers, of electrical impulses generated by brain activity and known popularly as "brain-waves" shows that brain activity, like heart activity, is constant but unlike heart activity, proceeds at different rates during sleeping, waking, and mental processes; that epilepsy is a sort of neurological storm set off by stimulation of a convulsion-causing brain center; that different kinds of brain activity occur under different anesthetic agents; and promises much future information about mental processes in health and disease. Scientists engaged in this research were: Drs. F. A. Gibbs, E. L. Gibbs, H. Davis, E. L. Garceau, A. Forbes, A. J. Derbyshire, B. Rempel, E. Lambert, Harvard University; Drs. H. H. Jasper and L. Carmichael, Brown University; Dr. A. L. Loomis and Garret Hobart, Loomis Laboratories, Tuxedo Park, N. Y.; and Prof. E. Newton Harvey, Princeton University.

Electrical impulses generated in the brain during sleep and dreams are paralleled in the case of deaf-mutes by similar impulses in the hands and arms, which they use in speech, experiments by Dr. Louis W. Max, New York University, disclosed.

A substance that can be applied to the outside of teeth to relieve pain during drilling and other dental procedures was announced by Dr. L. L. Hartman, Columbia University.

Dr. William H. Howell, emeritus professor of physiology, Johns Hopkins University, discovered that the blood platelets are formed in the lungs by giant cells called megacaryocytes.

Heart muscle tone is the chief factor influencing the blood flow through the heart's arteries and should be considered in prescribing drugs for heart disease due to occlusion of these arteries, Dr. William B. Kountz, Washington University School of Medicine, reported.

Choline, produced by the pancreas, is a vitamin essential for liver function and probably an important factor in control of diabetes, Dr. C. H. Best, co-discoverer of insulin, and Dr. M. Hershey and Miss M. E. Huntsman, all of the University of Toronto, found.

Relief of several cases of hitherto hopeless Pick's disease by surgical removal of part of the pericardium was reported by Drs. Paul D. White and E. D. Churchill, Massachusetts General Hospital, Boston.

A new hormone, enterogastrone, produced by the upper intestinal walls, which may aid treatment of stomach ulcer because it inhibits stomach activity, was announced by Prof. A. C. Ivy, Northwestern University Medical School.

Synthetic production of male sex hormones was reported by Dr. L. Ruzicka, Zurich, Switzerland.

Evidence presented by Dr. L. G. Rowntree and colleagues indicates that extract of pineal gland causes precocity of sexual development and premature cessation of body growth.

First scientifically controlled test of the Park-Brodie infantile paralysis vaccine was made by U. S. Public Health Service on over 1,000 children during the North Carolina epidemic, but was inconclusive as no cases developed in either control or vaccinated groups.

A slight drop in the cancer deathrate appeared in life insurance statistics for the first nine months of 1935.

Length of life can be predicted by measuring change of the eye lens' power of accommodation, early presbyopia indicating probability of a shorter than average life, Dr. Felix Bernstein, Columbia University, found from research on thousands of individuals in Germany.

Progress in cancer research was marked by chemical studies of cancer producing substances; one of these, methylchloranthrene, was made synthetically by Prof. Louis F. Fieser and M. Fieser, E. B. Hershberg, M. Newman and A. M. Seligman, Harvard University; discovery of two new cancer-producing chemicals, tetraphenyl-methane and triphenylbenzene, by Prof. Avery A. Morton and Dr. Daniel B. Clapp, Massachusetts Institute of Technology, and Dr. Charles F. Branch, Evans Memorial Hospital, Boston, show that the production of cancer by pure hydrocarbons is much more general than supposed.

Discovery that the female sex hormone produces tissue changes similar to beginning stages of cancer furnished evidence of a long-suspected but unproved relation between sex and cancer to Prof. J. B. Collip and Drs. H. Selye and D. L. Thomson of McGill University.

Inoculating cancer cells into the skin instead of under it made mice immune to cancer, Prof. Alexandre Besredka and Dr. Ludwik Gross of the Pasteur Institute, Paris, reported.

Discovery, in connective tissue tumors, of sex hormones which definitely influenced growth of the tumor indicated to Drs. Charles F. Geschickter and Dean Lewis, Johns Hopkins Hospital and University, that a connection may exist between sex and cancer.

Further support of the idea that heredity plays a part in cancer was seen by Dr. Raymond E. Militzer, Pondville Hospital, Massachusetts Department of Public Health, in the first known cases of simultaneous occurrence of stomach cancer in identical twins.

Isolation of the active principle of ergot, drug used in childbirth, was announced by several investigators, working independently.

A new amino acid, alpha-amino-beta-hydroxybutyric, essential for growth and life, was discovered, identified and prepared synthetically by Dr. William C. Rose and associates, Dr. H. E. Carter, Richard H. McCoy and Madelyn Womack, University of Illinois.

A substance which checks the action of the important digestive enzyme, trypsin, was discovered, isolated and prepared in pure crystal form by Drs. John H. Northrop and M. Kunitz, Rockefeller Institute for Medical Research, Princeton, N. J.

Ventricular fibrillation, fatal heart condition, and auricular fibrillation, another grave heart disorder, may be caused by the external nerves of the heart, researches by Drs. Louis H. Nahum and H. E. Hoff, Yale School of Medicine, revealed.

Ultraviolet rays, heat and calcium salts are three interrelated factors in the production of cataract, Dr. Janet Howell Clark, Johns Hopkins School of Hygiene and Public Health, found.

Maternal instinct in young rats is due to the influence of prolactin, pituitary gland hormone, and can be aroused in young virgin rats by injections of this hormone, Drs. Oscar Riddle, Ernest L. Lahr and Robert W. Bates, Carnegie Institution of Washington found.

Effect on the body of thyroid gland hormone and thyroid stimulating hormone of the pituitary gland is greatly influenced by temperature, lowered metabolic rate being produced by either of these hormones when given at 59 degrees Fahrenheit, Drs. Oscar Riddle, Ernest L. Lahr and Robert W. Bates, Carnegie Institution of Washington, found.

Important aid for the treatment of liver disease and for preparing patients suffering from fatty livers for operation was the discovery by Drs. J. L. Bollman and F. C. Mann, Mayo Clinic, that the composition of the liver can be varied within wide limits by diet.

Breeding experiments with mice, reported by Dr. E. C. MacDowell, Carnegie Institution of Washington, indicate that occurrence of leukemia, cancer-like condition of white blood cells, is increased through inheritance on the maternal side.

A method for keeping glands and possibly other organs alive outside the body by feeding a blood substitute by a mechanical "heart" was reported by Dr. Alexis Carrel, Rockefeller Institute, and Col. Charles A. Lindbergh.

Cause of the paralytic disease, multiple sclerosis, may be clotting of blood in the small veins of the brain, possibly as a result of infection, researches by Drs. Philip Solomon, Mary E. Dailey and Tracy J. Putnam, Harvard Medical School, indicated.

The world's record smallest viable baby, weighing one pound at birth, was born in El Paso, Texas.

Putting a specially prepared fat or olive oil mixture into the veins is a new method developed by Drs. L. Emmett Holt, Jr., Herbert C. Tidwell and T. F. McNair Scott, Johns Hopkins Hospital, for treating babies suffering from severe nutritional disorders.

A new function of the pituitary gland, control of the reticulo-endothelial system, which is concerned with production of new blood cells and destruction of old ones, was indicated in experiments of Prof. E. C. Dodds, Courtauld Institute of Biochemistry, and Dr. R. L. Noble, London.

First part of the human brain to develop is the area controlling what scientists call the body sense, Dr. Frederick Tilney and associates at the Neurological Institute, New York City, found in a study of the correlation between brain development and human behavior.

New evidence for the resonance theory of hearing was found by Dr. Elmer Culler, University of Illinois, and Dr. S. S. Stevens, Harvard, who, working independently, mapped the basilar membrane, locating experimentally the areas where each frequency range is picked up.

Very intense noise causes deafness for pitches other than that of the stimulus and injury in the ear's organ of Corti at points not involved in picking up moderate tones of similar pitch, researches at Harvard, Clark,

and Princeton Universities indicated, providing evidence that the resonance theory of hearing may need modification.

Evidence that the stimulus to the nerve of hearing is chemical and not electrical was obtained in researches by Drs. A. J. Derbyshire and H. Davis, Harvard Medical School.

A loud high-pitched sound produces more ear strain and greater loss of hearing if it is interrupted every second instead of being continuous, Dr. Elmer Culler and Glen Finch, University of Illinois, reported.

Chemical analysis of crystals of the fertility vitamin, E, show it to be a quite complex higher alcohol, Drs. H. M. Evans, O. H. Emerson and G. A. Emerson, University of California, reported.

An international clearing-house for serums used in treating, diagnosing or preventing disease was established at the Royal Danish Serum Institute, Copenhagen, by action of the Congress of Biological Standardization in connection with the League of Nations Hygiene Congress.

First step toward a simpler, cheaper and safer method of making Rocky Mountain spotted fever vaccine was apparently taken by Dr. R. E. Dyer and Ida A. Bengtson, U. S. National Institute of Health, when they succeeded in growing the virus of this fatal disease on chick embryos.

A new, physiological approach to methods for correction of stuttering was suggested by the finding of Hazle Geniesse, University of Michigan, that walking on all fours enabled stutterers to speak normally.

Physics

A new value for the atomic weight of hydrogen at 1.0081 instead of 1.0078 was determined by Prof. M. L. E. Oliphant, A. E. Kempton and Lord Rutherford, Cavendish Laboratory, Cambridge University, on the basis of atomic bombardment experiments.

By squeezing materials with pressures as high as a million pounds to the square inch while twisting them, Prof. P. W. Bridgman, Harvard University, is duplicating in the laboratory some conditions found within the earth which may account for the synthesis of strange compounds at ordinary temperatures.

The National Advisory Council on Applied Physics was formed to promote the wider use of physics in industry.

Preliminary stages of a new theory of physics which will link relativity with quantum theory in explaining atom happenings were devised by Prof. Albert Einstein and Dr. N. Rosen of the Institute for Advanced Study at Princeton, N. J.

Controversy continued over the new theory of relativity announced by Sir Shah Sulaiman, Indian justice and mathematician, which seeks to link the concepts of Newton and Einstein; criticism was advanced by D. R. Hamilton, Princeton mathematician, and the critique in turn was challenged by Sir Shah.

General agreement among scientists that a considerable amount of the incoming cosmic raidiation is of an electrified particle nature was announced during 1935, but whether the initial rays are chiefly photons or particles is still a topic of debate.

A new yardstick for measuring the earth's velocity relative to the rest of the universe may be the variation in cosmic ray intensity, according to a theory advanced by Prof. Arthur H. Compton, University of Chicago.

The magnetic field of the earth is lopsided, Dr. R. A. Millikan and H. Victor Neher, California Institute of Technology, determined from a precision sea-level survey of cosmic ray intensities made on ten different ships sent on voyages all over the world. Prof. M. S. Vallarta, Massachusetts Institute of Technology gave a theoretical interpretation of this phenomenon.

High altitude experiments on Mexican mountain tops gave Dr. Thomas H. Johnson, Bartol Research Foundation, further verification for the concept that the earth has a magnetic shadow.

Important observations of cosmic rays were made at the top of Pike's Peak by Drs. C. D. Anderson, R. A. Millikan, and S. H. Neddermeyer.

A new explanation of the origin of cosmic rays which considers the rays as free particles in space which have been increasingly accelerated on their unimpeded journey to measurement on the earth was announced by Prof. E. A. Milne, Oxford University, England.

By a technique comparable with determining a hurricane's force by the amount a ship might be blown off its course, Prof. W. F. G. Swann and Dr. W. E. Danforth, Bartol Research Foundation, are using cosmic rays to study the strength of magnetism within a magnet.

By bombarding the light element lithium with protons, Prof. C. C. Lauritsen and coworkers, California Institute of Technology, produced 16,000,000 electron volt gamma rays, six times as piercing as the strongest of those produced by natural terrestrial sources.

Synthetic radiosodium, hailed as a possible substitute for radium in the treatment of cancer by radiation therapy, was made in increased amounts by Prof. E. O. Lawrence, University of California.

A giant X-ray tube for use with the great 7,000,000 volt electrostatic generator is being developed by Prof. Robert Van de Graaff of Massachusetts Institute of Technology.

Using a vacuum rotor, Dr. J. W. Beams, University of Virginia, created forces, 7,000,000 times as great as gravity for use in separating isotopes.

Evidence that the base of the stratosphere varies from 4.7 miles to 7.5 miles above the earth within a day was obtained by sounding balloon investigations carried on by Massachusetts Institute of Technology scientists at St. Louis, Mo.

Samples of the air 13 miles above the earth were obtained by the stratosphere balloon Explorer II and in England with smaller sounding balloons.

Three-dimensional X-ray pictures were produced by Dr. O. Russo, State Roentgen Institute, Moscow.

Further research on rockets at Clark University indicated a way to permit rocket flight in the stratosphere without the necessity of carrying liquid to burn the rocket fuel.

A new record for the "coldest cold" was set at only five one-thousandths of a degree above absolute zero by Prof. W. J. De Haas, Leyden University.

Temperatures of 1,700 degrees Fahrenheit 150 miles above the earth are needed to explain the results of radio reflection experiments from the ionized layers there, Prof. E. V. Appleton, University of London, found.

Another radio reflecting layer high above the earth at an altitude of 35 miles, called the D layer, was discovered by the Indian scientist Mitra P. Syam.

High velocity air currents in thunderstorms help to produce lightning by separating positive and negative ions in the atmosphere, Dr. Ross Gunn, Naval Research Laboratory, found.

Enormous voltages are not necessary to lightning, according to high speed photographs taken by Drs. B. F. J. Schonland, D. J. Malan and H. Collins, South African scientists, who note the stroke proceeds by series of steps.

A new instrument developed by Dr. Harry H. Hall, Cruft Laboratory, Harvard, analyzes the quality of sound in four seconds instead of several days as required by older methods.

A world-wide survey of natural radioactivity was proposed by Dr. V. I. Vernadsky, U.S.S.R. Academy of Sciences, as an aid in determining the distribution of rocks of various geologic ages and in locating helium deposits.

A new type of alternating current bolometer for measuring minute amounts of radiation, which overcomes the handicaps of sensitive galvanometers used previously, was developed by Prof. P. H. Moon, Massachusetts Institute of Technology.

Psychology and Psychiatry

If the brain's motor area is injured during infancy, other parts of the brain and nervous system can assume its functions, but the association area cannot delegate its functions, Drs. Carlyle F. Jacobsen and George M. Haslerud of Yale found.

Memory for long past events is an entirely different process from memory that enables holding in mind different aspects of a problem during solution; former remains unimpaired and latter is lost with injury to the brain's association areas, Dr. Carlyle F. Jacobsen of Yale found, in studies of the animal brain.

Adults can learn faster than children, and a man of 65 can expect to learn more per hour than he could at 8 or 10, Dr. Edward L. Thorndike, Teachers College, Columbia University, reported.

Dull children continue to grow mentally just as long as do bright children, and both continue development up to the age of 20 or more, Dr. Frank N. Freeman, University of Chicago, concluded from repeated testing of a large number of children.

The most fruitful years for scientific and other creative work come before the age of 40, Dr. Harvey C. Lehman, Ohio University, found from statistical study of great men.

A repetition, with girls (Florie and Margie), of the twin experiment in which one child was given training while the other was left unstimulated, confirmed previous findings (Jimmy and Johnny) that learning of certain skills depends upon maturity as well as on opportunity to learn, Dr. Myrtle B. McGraw, Babies Hospital, New York, reported.

Dr. W. F. Windle, Northwestern University Medical School and Drs. L. Carmichael and C. S. Bridgman, Brown University, independently established that, at least in certain mammalian fetuses, the first responses are reflex in character and do not involve general behavior, as previously supposed.

Canaries learned songs while soundproofed from other birds, demonstrating to Prof. Milton Metfessel, University of Southern California, that self-teaching is possible when the learner works toward no pattern or finished goal.

That learning is possible without doing was demonstrated by Dr. Paul H. Settlage, University of Wisconsin, when animals under influence of sodium amytal formed conditioned reflexes although prevented by the drug from practice while learning.

A conditioned reflex remains permanent only if the incentive for its performance continues, according to results of Prof. Elmer Culler and Glen Finch, University of Illinois.

Man learns to stand erect by a roundabout, process of development, Dr. Helen Thompson, Yale University, found.

Study of the human voice by electrical methods was pursued in the attempt to account for differences in timbre and pronunciation by Drs. A. Gemelli and G. Pastori, Italy.

Cats that have lost the entire visual cortex can discriminate brightness differences normally under general dark-adapted conditions but not under general light-adapted conditions, Dr. K. U. Smith, Brown University, demonstrated.

New knowledge of how colors are perceived was obtained by Drs. C. H. Graham, L. A. Riggs, H. K. Hartline, and E. H. Kemp, by measuring electric potentials on the eye's retina.

The Psychometric Society, composed of those interested in mental measurement, was formed at the meeting of the American Psychological Association and will be affiliated with that organization.

General mind-power ("G" to psychologists) underlies all abilities except physical strength and fancifulness, Prof. Charles Spearman, University of London, found by applying 92 tests to 1200 students.

Social smiling in the infant is not instinctive but is a learned or conditioned, response to the person or thing which relieves discomfort or distress, Dr. Wayne Dennis, University of Virginia, and Mrs. Dennis concluded from study of their twin babies.

Mental examination for infants under one year old was shown to be practical as a routine in child placing by Dr. Kenneth H. Rogers, University of Toronto.

The greatest number of very superior children come from middle-class parents, although professional people contribute more geniuses in proportion to the size of that group, Prof. Edward A. Lincoln found from study of 3,000 school children at the Harvard Psycho-Educational Clinic.

Normal intelligence in a 9-year-old boy whose head was smaller than that of a normal one-year-old infant was reported by Dr. Wilbert S. Ray, New Jersey State Hospital.

Happily married couples come from homes with happy parents, and have common interests outside the home, Drs. Lewis M. Terman and Paul Buttenwieser, Stanford University, found from a survey of California marriages.

Altruism and cooperation are possible among apes, Dr. H. W. Nissen and M. P. Crawford, Yale Laboratories of Comparative Psychobiology, found in experiments in which chimpanzees shared the food they gained by cooperative labor.

The first chimpanzee having a mother born and raised under scientific observation was born at the Yale Laboratories of Comparative Psychobiology.

Completion of the first year of life by the only known chimpanzee twins was reported by Dr. Robert M. Yerkes and Michael I. Tomilin, Yale University's Laboratories of Comparative Psychobiology, who found that the mother discriminated in favor of the weaker twin in a manner never observed among lower mammals.

Research films in psychology were officially recognized as belonging to the scientific literture of this field and film abstracts were published in the *Psychological Abstracts*.

A movement by psychiatrists against the insanity of war was initiated when the Netherlands Medical Association's Committee on War Prophylaxis sent to statesmen of the world a warning against "war psychosis," signed by 339 psychiatrists of 30 nations.

FROM A DINOSAUR'S GIZZARD

Lee Stokes, junior at Brigham Young University at Provo, Utah, collects dinosaurs; he thinks he has the best dinosaur collection outside the big museums. Here he is shown holding a double handful of "stomach stones" found with a dinosaur skeleton. The big reptiles swallowed hard rocks as present-day chickens do pebbles, and for the same purpose—to grind up the food which they probably gulped down whole.

Removal of all but a small portion of the frontal area of the brain with no impairment of intelligence in the patient, but increased concentration or perseveration, was the result of an operation performed by Dr. Glen Spurling, University of Louisville, and reported by Dr. S. Spafford Ackerly.

A fund of $55,000 for research in dementia precox was established by the Scottish Rite Masons of northern United States for administration by the National Committee for Mental Hygiene.

Manic depressive insanity has two underlying hereditary factors, "cyclothymic" and "activating," each widely distributed in human beings, but both necessary in combination to produce the disease, Dr. Aaron J. Rosanoff, Leva M. Handy and Isabel Rosanoff Plesset concluded from examination of 90 pairs of twins at the Los Angeles Diagnostic Clinic.

Evidence that the mental disease schizophrenia affects body as well as mind is afforded by the failure of patients to react normally after a cold water plunge, Drs. Isidore Finkelman and W. Mary Stephens, Elgin, Ill., State Hospital, reported.

Further evidence that the mental disorder, schizophrenia, may be due to defective brain oxidation was presented by Drs. J. M. Looney and H. Freeman, Worcester Hospital, who showed that not only is the rate of blood flow diminished but the volume of the blood is less than normal.

Senility was explained on a new physiological basis as a result of comparison with a similar mental condition, Alzheimer's disease, by Drs. David Rothschild, Foxborough, Mass., State Hospital, and Jacob Kasanin, Rhode Island State Hospital for Mental Diseases.

Sodium rhodanate is useless for treating mental disease, Dr. Purcell G. Schube, Boston State Hospital, found from experience with 75 patients.

Prolonged use of alcohol may cause loss of intelligence, Dr. Harry C. Mahan, Warren State Hospital, reported.

Alcoholism more often results from pampering by mothers than from alcoholism in fathers, study of 100 male alcoholics at Bloomingdale Hospital revealed to Dr. James H. Wall.

The first U. S. Narcotic Farm with a capacity of 1,000 beds for the care and treatment of narcotic addicts from Federal penal institutions and voluntary addict-patients was opened by the U. S. Public Health Service on May 25 with about 300 addict prisoners as the first patients.

The value of a short course of treatment at a clinic for mild cases of mental disease, especially anxiety states, was reported after a follow-up study of 500 cases by Dr. Mary C. Luff, Institute of Medical Psychology, London.

Training in spontaneity, as used in training dramatic actresses, is a new technique for reclaiming delinquent girls for useful living, Dr. Jacob L. Moreno and Helen Jennings, New York Training School for Girls, reported.

Suggestion combined with electric currents or anesthesia effected almost instantaneous cures of hysterical paralysis similar to the "miraculous" cures of faith healers, Dr. Abraham Myerson, Boston State Hospital, reported.

Rewards and Recognitions

The Nobel Prize in medicine for 1935 was awarded to Prof. Hans Spemann, of Freiburg, Germany, for his researches on the minute embryonic cells from which animals develop.

The Nobel Prize in physics for 1935 was awarded to Dr. James Chadwick, of Liverpool University, for his discovery while at Cavendish Laboratory, Cambridge, of the neutron, one of the three ultimate particles of all matter; the 1934 prize in physics being added to the Nobel fund.

The Nobel Prize in chemistry was granted to Prof. J. Joliot and his wife Mme. Irene Curie-Joliot for their joint discovery of artificial radioactivity and manufacture of new radioactive elements; the first occasion on which this prize has been awarded to the daughter of a Nobelist.

Dr. Willard M. Allen, University of Rochester, was honored for his research on progestin, female sex hormone, by being the first recipient of a $1,000 prize awarded by Eli Lilly and Co. to youthful biological chemists.

Dr. Joseph S. Ames, Johns Hopkins University, was awarded the Langley medal for Aerodromics of the Smithsonian Institution for the great advancement of aviation resulting from researches conducted by the National Advisory Committee for Aeronautics under his direction.

The gold medal of the American Institute was awarded to Dr. Carl D. Anderson, California Institute of Technology, for discovery of the positron.

Dr. Serge Androp, Ohio Hospital for Epileptics, Gallipolis, Ohio, was awarded a $3,000 prize by the Eugenics Research Association for research on the probability of

commitment for mental disorder based on family history.

On his 50th birthday, Prof. Neils Bohr was honored by a gift of half a gram of radium for his researches upon the constitution of matter.

Dr. Isaiah Bowman, president of Johns Hopkins University, received the first award of the Bryant Gold Medal of the Geographical Society of Philadelphia.

Dr. J. McKeen Cattell was honored with a parchment testimonial presented to him by the American Psychological Association for his distinguished services to psychology.

The Daniel Giraud Elliot medal of the National Academy of Sciences was awarded to Dr. James P. Chapin, American Museum of Natural History, for his researches on Belgian Congo birds.

Dr. Karl T. Compton, president of Massachusetts Institute of Technology, was elected president of the American Association for the Advancement of Science for 1935.

Erection of a monument on the Galapagos Islands honored Darwin on the 100th anniversary of his early researches leading to the theory of evolution.

Dr. C. J. Davisson of Bell Telephone Laboratories was awarded the Hughes Medal of the Royal Society for his discovery, jointly with Dr. L. H. Germer, of electron diffraction.

E. I. du Pont de Nemours and Company was honored by the journal Chemical and Metallurgical Engineering for achievement in the fields of synthetic rubber, synthetic camphor, and organic chemistry.

Dr. William Frederick Durand, professor emeritus of mechanical engineering, Stanford University, was awarded the John Fritz Gold Medal by a group of engineering societies and also the Guggenheim aviation award, for his researches in hydrodynamics and aerodynamics.

The Franklin Medal of the Franklin Institute was awarded to Prof. Albert Einstein for researches on relativity and the photoelectric effect, and, also to Sir John Ambrose Fleming for his invention of the thermionic valve named for him.

The Sedgwick Memorial Medal awarded by the American Public Health Association for distinguished service in public health was granted to Dr. Haven Emerson, College of Physicians and Surgeons, Columbia University.

Dr. Raymond M. Fuoss, Brown University, received the American Chemical Society's $1,000 award for research in pure chemistry conducted by chemists under 31 years old.

The Agassiz medal for oceanography of the National Academy of Sciences was conferred on Prof. Haakon Rasberg Gran, of Oslo.

Prof. John H. Gregory, Johns Hopkins University, was awarded the medal of the American Society of Civil Engineers for an original paper.

The Collier Trophy in aviation was awarded to Capt. Albert F. Hegenberger for his development of blind landing equipment.

Dr. Samuel L. Hilton, Washington, D. C., was awarded the Remington medal by the New York Branch, American Pharmaceutical Association.

Dr. Frederick Webb Hodge, director of the Southwest Museum, was honored upon completion of 50 years of research on American prehistory by creation of a fund for publishing works on American anthropology.

Dr. Frank B. Jewett, president of the Bell Telephone Laboratories, received the Faraday Medal of the Institution of Electrical Engineers.

Dr. Vernon Kellogg, secretary emeritus of the National Research Council, was elected honorary vice-president of Science Service.

The $1,000 prize of the American Association for the Advancement of Science was awarded to Dr. Vern O. Knudsen, University of California at Los Angeles, for his experiments with sound in gases affecting auditorium design and sound signalling.

Dr. Charles A. Krauss, Brown University, was awarded the Willard Gibbs Medal of the Chicago Section, American Chemical Society, for his research on the theory of solutions.

Dr. Warren K. Lewis, Massachusetts Institute of Technology, was awarded the Perkin Medal by five major chemical societies for his contributions to applied chemistry.

Dr. Frank R. Lillie, University of Chicago, was elected president of the National Academy of Sciences and Chairman of the National Research Council.

Dr. Jacob Goodale Lipman, Rutgers University, and director of the New Jersey Agricultural Experiment Station, received the Chandler Medal from Columbia University for his achievements in agricultural chemistry.

Dr. Leo Loeb, St. Louis, was awarded the John Phillipps Memorial Prize of the American College of Physicians.

Dr. Francis F. Lucas, Bell Telephone Laboratories, received the Wetherill Medal from the Franklin Institute for development of a technique of photomicroscopy.

Dr. Frank Burr Mallory, received the Kober Medal of the Association of American Physicians.

The Edward Longstreth medal of the Franklin Institute was awarded to K. B. McEachron, General Electric Company, for studies with artificial lightning up to 10,000,000 volts.

Dr. Karl Mason, Vanderbilt University, and Dr. S. B. Wolbach, Harvard Medical School, shared the $5,000 award of Mead Johnson and Company, in recognition of their researches on vitamin A.

The Gold Medal of the Royal Astronomical Society of London was awarded to Prof. E. A. Milne, Oxford, for his work on radiative equilibrium and theory of stellar atmospheres.

Robert E. Naumberg, New York, received the Franklin Institute's Wetherill Medal for his visagraph, new method of making printed matter readable for the blind.

Rev. Julius A. Nieuwland, University of Notre Dame, was awarded the Gold Medal of the American Institute and also the William H. Nichols Medal of the New York Section, American Chemical Society, for his basic research leading to development of synthetic rubber.

The American Chemical Society awarded its Priestley Medal "for distinguished service to chemistry" to William Albert Noyes, emeritus director of the laboratories of the University of Illinois and founder of "Chemical Abstracts."

Dr. William H. Park, director, Bureau of Laboratories, New York City Health Department, was granted the Roosevelt Medal by the Theodore Roosevelt Memorial Association for his contributions to public health, especially in the conquest of diphtheria.

The Henry Draper medal for astronomy of the National Academy of Sciences was conferred upon Dr. J. S. Plaskett, director of Canada's Dominion Astrophysical Observatory, Victoria.

Prof. C. G. Rossby and Prof. H. C. Willett of the Massachusetts Institute of Technology were awarded jointly the first Sylvanus Albert Reed award of the Institute of Aeronautical Sciences.

The M. Carey Thomas $5,000 award for eminent achievement was bestowed on Dr. Florence R. Sabin, Rockefeller Institute, by Bryn Mawr.

W. H. Shortt, Exeter, England, and F. Hope-Jones, London, were awarded the Wetherill Medal of the Franklin Institute for their development of the free-pendulum type precision clock used in standard time control in England and the United States.

Dr. James E. Shrader, Drexel Hill, Pa., received the Franklin Institute's Wetherill Medal for invention of a portable apparatus for recording direction of vibration in three dimensions.

The stratosphere flyers, Capt. Albert W. Stevens, and Capt. Orvil A. Anderson, were honored with the Hubbard Gold Medal of the National Geographic Society.

Dr. Elihu Thomson, General Electric Company, was awarded the medal of honor of the Varein Deutscher Ingenieure, high award of the German engineering profession.

Dr. L. B. Tuckerman, National Bureau of Standards, received the Franklin Institute's Wetherill Medal for development of an improved optical lever.

The Public Welfare medal of the National Academy of Sciences was awarded to August Vollmer, University of California expert in police administration.

The Cameron Prize of the University of Edinburgh was awarded to Dr. Julius Wagner-Jauregg, University of Vienna, for his discoveries on dementia paralytica.

Henry Ellis Warren, Warren Telechron Company, received the Franklin Institute's Wetherill Medal and also the Lamme Medal of the American Institute of Electrical Engineers for development of electrically regulated clocks.

Dr. Edward R. Weidlein, director of the Mellon Institute for Industrial Research, received the Society of Chemical Industry's Medal in recognition of the valuable application of chemical research made under his direction.

A fossil tree, originally identified by the late Dr. David White was donated by its discoverer, John Fitts, to the East Central Teachers College, Ada, Oklahoma, and erected there in recognition of Dr. White's researches in paleobotany.

Dr. Willis R. Whitney, General Electric Company, was awarded the Edison Medal of the American Institute of Electrical Engineers for his contributions, his pioneer inventions, and his inspiring leadership.

The Dana Medal awarded by the St. Louis Society for the Blind to the friend of the blind most outstanding in science, letters, and surgical art, was presented to Dr. William H. Wilder, Chicago.

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ZOOLOGY

NATURE RAMBLINGS
by Frank Thone

The Boar's Head

IN THE lordly days of old manorial England, the Christmas feast used to be crowned, not with the bringing in of a roast fowl (though there were plenty of those, from hens to peacocks), but with the formal serving up of a great boar's head.

To us, who see nothing especially esthetic in a hog, this custom may seem a bit strange. But when we examine the historic background that lies behind it the strangeness vanishes.

For Christmas, or at least a midwinter feast, used to be celebrated pretty much all over the earth long before the coming of Christianity. The missionaries who came to our pagan forebears in the nordic lands abolished the old gods but kept the old feast, rededicating it to the Child of Bethlehem.

To the northern pagans the wild pig was an emblem of fertility, of good luck, of plenty of good eating. Even today the Germans preserve a relic of this belief in a slang phrase. When a man has had a stroke of good fortune, his felicitating neighbors say, "He's caught a pig!"

Therefore there was something almost sacramental about the eating of swine's flesh, and the head of the old boar, the father and fountain-head of the forest-roaming herd, was an article of especial religious virtue as well as of social prestige. So our remoter grandsires ate it, well knowing what it signified, and their intermediate descendants in more elegant days continued the custom though they had forgotten its meaning. No doubt many thousands of soundly orthodox squires and nobles, all through medieval and early modern times, carved boars' heads at Yuletide, never suspecting that they were continuing a sacrifice to the midwinter gods of their Celtic and Saxon forebears.

Science News Letter, December 21, 1935

MEDICINE

Treating Deficiency Diseases Is a Complicated Problem

Constitutional Variations, Infection, Allergy, Even Mental Upsets are Among Factors Involved

TREATING what doctors call the deficiency diseases, such as pernicious anemia, is often a complicated matter, and simply feeding an adequate diet is not always enough, Dr. William P. Murphy of the Peter Bent Brigham Hospital, Boston, told members of the American Dietetic Association at the opening session of their annual meeting in Cleveland.

Dr. Murphy is one of the trio of American scientists who were awarded the Nobel Prize in medicine last year for their achievements in the conquest of pernicious anemia.

Diseases like pernicious anemia, diabetes and rickets are known as deficiency diseaes. They may arise because the patient has not eaten enough of the necessary food elements, or because his body is unable to utilize the food he eats, or because one or more of his glands fail to function normally, Dr. Murphy explained.

Unfortunately, Dr. Murphy said, an understanding of deficiency diseases is not so easy as a simple statement of the ways in which a deficiency may be produced may lead one to believe.

"For example, it is difficult to explain the development of anemia in one individual and not in another, both of whom may have a comparable intake of iron-containing foods. Constitutional variations, infection, allergy, intestinal disturbances, mental upsets, hemmorrhage, pregnancy and perhaps other factors may each play a part in the development of the diseases which are more commonly ascribed to the deficiency of a specific substance.

"So, because of the fact that the disease picture is often a complicated one, the treatment of a deficiency state is not the simple one of supplying the lacking substance but rather one of ministering to all of the needs of each patient, which needs may be determined only after the most detailed study and analysis of the individual's general state of health.

"Of the many deficiency states which have been recognized those which are dependent, at least in part, upon an inadequate supply of something usually supplied in the normal diet undoubtedly predominate. Into this group fall certain of the anemias."

Pernicious anemia sufferers no longer need to eat large quantities of liver daily, Dr. Murphy told the dietitians, since they can now remain well when taking injections of very small amounts of liver extract at intervals of two to four weeks. However, their diet must still be watched.

"Although liver or an effective substitute is of prime importance in building the blood it is always advisable to be sure that a normal, well balanced diet is being taken," Dr. Murphy said, "and in some instances the use of iron by mouth is necessary in order to allow hemoglobin formation to keep pace with the rapid increase in the red blood cells which is produced by the newer and more efficient treatment."

Science News Letter, December 21, 1935

RADIO

Tuesday, Dec. 24, 4:30 p. m., E.S.T.
REINDEER AND CHRISTMAS TREES —Dr. W. B. Bell, U. S. Biological Survey, and George A. Duthie, U. S. Forest Service.

Tuesday, December 31, 1:30 p. m., E.S.T.
SCIENCE OF 1935—A review of this year's achievements and brief forecasts for 1936 by several scientists.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

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•First Glances at New Books

Natural History

WILD LIFE OF THE SOUTH—Archibald Rutledge—*Stokes*, 253 p., $1.75. The author's approach is neither scientific nor pedagogical; he is just a man who lives in the South and loves outdoor tramping and hunting. His chapters are very short, always in the first person and reporting first-hand observations of bits of animal behavior that are unfailingly interesting, and frequently amusing as well.

Science News Letter, December 21, 1935

Natural History

CURIOUS HABITS OF OUR COMMON BIRDS, ANIMALS AND PLANTS—John H. Furbay—*Noble & Noble*, 254 p., $2. Third printing of a nature-study book, written in brief digestible chapters, each with a vivid black-and-white illustration. There is a useful appendix on how to make a nature collection.

Science News Letter, December 21, 1935

Juvenile

AROUND THE WORLD WITH THE ALPHABET—Hendrik W. Van Loon—*Simon & Schuster*, 26 colored page illustrations, facing text, $1. A gay book, "to teach little children their letters and at the same time give their papas and mamas something to think about." A is for Athens, Z is for Zermatt, with an alphabet and a world between the two. Van Loon's priceless illustrations and style need no description.

Science News Letter, December 21, 1935

Natural History

FOOT PRINT SERIES: GIANTS OF THE ANIMAL KINGDOM, 23 p.; MONKEYS AND APES, 19 p.; STRANGE ANIMALS, 18 p.; WILD OXEN, 18 p.—H. B. Harte—*Orthovis Co.*, $1.00 per set, plus postage; TEACHING MANUAL FOR ABOVE, 23 p., 10c. plus postage—*Orthovis Co.* Review published October 19, publisher's name omitted.

Science News Letter, December 21, 1935

Parliamentary Practice

PARLIAMENTARY PRACTICE—W. Roy Diem—*School and College Service*, 165 p., 48c. For schools, clubs and other organizations.

Science News Letter, December 21, 1935

Textile Manufacture

TEXTILE FABRICS AND THEIR SELECTION—Isabel B. Wingate—*Prentice-Hall*, 511 p., 53 figs., $5. Individuals who sell textiles, and those who buy them off the bolt or as finished garments, can obviously get better results if they have a fund of specific information about materials. This volume, designed to supply background knowledge, is a very thorough-going lesson book, written in language that any ambitious salesman or consumer can understand. It goes considerably beyond mere comparison of one textile with another, and discusses such matters as Sanforizing, care of knitted garments, and how to estimate material for curtains.

Science News Letter, December 21, 1935

Philosophy

FREEDOM OF MAN—Arthur H. Compton—*Yale Univ. Press*, 153 p., $2. Prof. Compton, backed by certain implications derivable from the new physics, breaks away from the rigidly deterministic philosophy that dominated the thinking of scientists of the nineteenth century. He ends with a frank declaration of his personal acceptance of Christianity, and of "reason to believe in an immortality of consciousness which is not vetoed by the data of science."

Science News Letter, December 21, 1935

Economics

BALANCING THE ECONOMIC CONTROLS—Russell A. Stevenson and Roland S. Vaile—*Univ. of Minnesota Press*, 96 p., $1.50. Readable and thought provoking is this inquiry into what would keep the social and economic structure on an even keel in troubled times. The suggestions are specific in many cases. There is admission that "it seems impossible at present for a centralized authority to know in advance the extent to which controls should be applied." Many matters of great importance to industry and labor are discussed, such as the wages adjusted to cost-of-living, etc.

Science News Letter, December 21, 1935

Economics

WHAT THE DEPRESSION HAS DONE TO CITIES—Ed. by Clarence E. Ridley and Orin F. Nolting—*The International City Managers' Association*, 58 p., $1. By 13 authors, each of whom discusses a special field in which he or she has special knowledge, including such matters as finance, public health, schools, housing, and so on.

Science News Letter, December 21, 1935

General Science

OUTPOSTS OF SCIENCE—Bernard Jaffe—*Simon and Schuster*, 547 p., $3.75. A pilgrimage to those places where great scientists work provided the material for this book, in which the recent advances in various fields of science are woven about the personalities and achievements of leaders in each field. Some of the scientists treated are: Robert A. Millikan, Thomas Hunt Morgan, Edwin P. Hubble, John Jacob Abel, Maud Slye, Adolf Meyer, Arthur H. Compton, George Ellery Hale, Richard C. Tolman, Ales Hrdlicka, Leland O. Howard, Elmer V. McCollum, and Charles G. Abbot.

Science News Letter, December 21, 1935

Economics

ECONOMICS OF PLANNING; PRINCIPLES AND PRACTICE—H. R. Burrows and J. K. Horsefield—*American Academy of Political and Social Science*, 31 p,. 50c. A useful study of British origin in which the planning experiments in Russia, America, Italy and Great Britain are described and analyzed.

Science News Letter, December 21, 1935

Economics

HOW CITIES CAN CUT COSTS—Ed. by Clarence E. Ridley and Orin F. Nolting—*International City Managers' Association*, 58 p., $1. Discussing a subject dear to the heart of every taxpayer.

Science News Letter, December 21, 1935

Public Health

HEALTH PROTECTION IN THE U.S.S.R.—N. A. Semashko—*Putnam's*, 176 p., $1.75. This small volume describes briefly the organization of medical and health facilities in Soviet Russia. Considerable improvement in health conditions is claimed as a result of these facilities.

Science News Letter, December 21, 1935

Education

THE APPLICATION OF RESEARCH FINDINGS TO CURRENT EDUCATIONAL PRACTICES—*American Educational Research Assn.*—273 p., $1.50. A complete report of round table conferences on research problems of a department of the National Education Association.

Science News Letter, December 21, 1935

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